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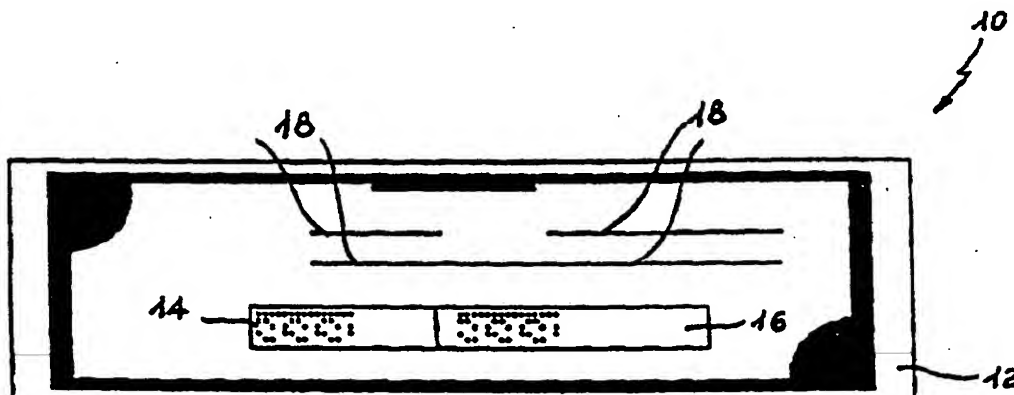
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(21) International Application Number: PCT/IT94/00135 (22) International Filing Date: 10 August 1994 (10.08.94) (71) Applicant (for all designated States except US): PRIMA OFFICINA CARTE VALORI TURATI LOMBARDI & C.S.P.A. [IT/IT]; Viale Lombardia, 25, I-20056 Trezzo Sull'Adda (IT). (72) Inventor; and (73) Inventor/Applicant (for US only): BOZZO, Ferdinando [IT/AT]; Kendlerstrasse 76, A-Salzburg (AT). (74) Agent: LECCE, Giovanni; Via Gaetano Negri, 10, I-20123 Milan (IT).		(81) Designated States: AM, AU, BB, BG, BR, BY, CA, CN, CZ, FI, GE, HU, JP, KG, KP, KR, KZ, LK, LT, MD, MG, MN, NO, NZ, PL, RO, RU, SI, SK, TJ, TT, UA, US, UZ, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG), ARIPO patent (KE, MW, SD). Published With international search report.	

(54) Title: CREDIT DOCUMENT CONNECTED TO A DOCUMENT OR CUSTOMISED CARD, INDEPENDENT CUSTOMISED CREDIT CARD AND ASSOCIATED ISSUANCE AND VALIDATION EQUIPMENT



(57) Abstract

A credit document (10) connected to a customised document or card (22) is formed of a watermarked paper support (12) with at least one dotted safety coding in linear and cryptographic form on the basis of a key consisting of an individual code. The customised document or card (22) incorporates a microchip for the memorisation of the identification code and of at least one mathematical expression which transcodifies the fingerprint of one or more fingers of the applicant. The equipment for formation of the customised document or card (22), the credit documents (10) and related validation comprises a scanner (28, 38, 38') for taking said fingerprints, compared with those of the owner of the customised document or card (22) upon issuance of the document and during use at the sales points. The watermarked paper support (12) exhibits one or more with copper-plate engraving print reliefs measured by a micrometric sensor (44) integrated in the validation equipment. A customised credit card calls for memorisation of the same parameters transcodified in the related microchip.

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DESCRIPTION

Credit document connected to a document or customised card, independent customised credit card and associated issuance and validation equipment

Technical Field

5 The present invention relates to a credit document connected to a customised document or card, to an independent customised credit card, and to the related equipment for issuance and validation.

Specifically the present invention relates to a credit document for provision of a payment system having characteristics of absolute safety, and to the equipment which allows issuance, control and validation of the credit document and of the
10 complementary identification document and a traditional credit card customised and validated by the above mentioned equipment.

Background Art

As known there exist various instruments for the settlement of commercial exchanges or the transfer of goods and services
15 between one individual and another.

In addition to legal tender, used in general for negotiations of small amount, there are used credit documents, e.g. bank and bankers cheques, whose function is to limit the risks connected with circulation of said credits.

20 Another instrument always more widespread and which allows making payments consists of credit cards consisting of non-trasferrable documents which authorised the holder to purchase goods and services from third parties approved by the issuer of the card, in general banks and financial

organisations, to which is transferred the onus of payment.

The payment instruments alternative to cash avoid the user's holding available an amount of money, sometimes large, with the related risks. Even these instruments are not considered quite
5 safe. The credit cards can be readily used by third parties at least up to the time of reporting of their robbery or loss, while cheques, despite numerous provisions adopted, are skilfully counterfeited and falsified. Given the large number of payment operations performed each day it is understandable how
10 these problems are perceived in a very serious manner, considering that they involve simultaneously numerous categories, i.e. the customers, credit organisations, and the authorities responsible for control and repression.

Disclosure of Invention

15 The purpose of the present invention is thus to obviate the shortcomings set forth above.

Specifically the purpose of the present invention is to provide a payment means in the form of a credit document extremely safe, useable only by the person to whom issued on the basis of a
20 customised document. Another purpose of the present invention is to achieve the same guarantee as concerns safety for the widespread credit cards.

Another purpose of the present invention is to provide the specific equipment for creation of the credit documents and
25 related customised document, of the independently customised credit card, and control and validation thereof.

These and other purposes are achieved by the credit document connected to a customised document or card, independently customised credit card integrated on a microchip
30 which is the object of the present invention which comprises

basically a watermarked paper support with copper-plate engraving print and is characterised in that it exhibits one or more safety codes related to the data of the transaction, expressed in two fields, in linear dotted and/or cryptographic form on the basis of a key consisting of an identification code in the microchip of the card or credit card being memorised said identification code and at least one mathematical expression which transcodifies the fingerprint of one or more fingers of the applicant on the credit document.

10 The constructive and functional characteristics of the credit document connected to a document or customised card and of the independently customised credit card which is the object of the present invention as well as the associated formation, control and validation equipment for said document are set forth in the description of a preferred embodiment thereof given below by way of non-limiting example with reference to the annexed drawings in which:

FIG. 1 shows schematically an example of a configuration of the paper support forming the credit document which is the object of the present invention,

FIG. 2 shows a block diagram of the equipment for creation of the identification document connected to the credit document,

FIG. 3 shows a block diagram of the equipment for issuance of the credit document on the basis of the identification document,

25 FIG. 4 shows a block diagram of the equipment designed to validate the credit document,

FIG. 5 shows the flow diagram of the payment system stating from creation of the identification document.

With reference to the figures the paper support forming the credit document which is the object of the present invention

indicated by 10 in Fig. 1 is made up of a strip of watermarked paper 12 having preferably the same size as the traditional bank cheques and on which are achieved two fields 14, 16 for application of the safety code of the type with dots and hence not interpretable on sight. The device provided in the field 14 comprises e.g. the date of issuance of the document, the issuer's code (bank of financial institution) and the amount of the title. The same data are shown in field 16 expressed in cryptographic form by means of a key consisting of an individual code and as such associated univocally with the owner of the document. Said individual code is preferably made up of an alphanumerical sequence.

The paper support 10 achieved with copper-plate engraving comprises also one or more print relieves formed along predetermined areas of the strip 12 and detectable by means of sensors integrated in the validation equipment discussed below. Same parts immediately detectable on sight of the paper support 10 forming the credit document are indicated by way of example by 10 on the strip 12 formed by with copper-plate engraving or other print systems to identify the issuing bank or institute, the amount of the credit document and its serial number, payment order, etc. Application of the safety code on the credit document for issuance to the customer requesting it is subject to possession of a special customised document per in the form of a card. Said card constitutes an integral part of the document and allows first issuance with the safety code and furthermore subsequent validation upon use. The personal card, advantageously proposed in the form of an electronic smart card having the same size as the wide spread credit cards, incorporates a microchip on which is memorised, electric motor

the procedure and device specified below, the individual code in the form of an alphanumerical sequence as well as a univocal personal characteristic of the user or applicant. Said personal characteristic in accordance with the present invention consists of a mathematical expression which transcodifies the parameters associated with the fingerprint of one or more fingers of the user or applicant. The fingerprint as known is defined by the projections of the skin which give rise to figures which do not change with the passage of time in the same person. This peculiar aspect then gives rise to a univocal personal characteristic adopted here without creation of centralised fingerprint files by means of transcodification in a mathematical expression of the fingerprint taken as concerns reading at a number of points sufficient to avoid interpretative doubts. Said taking, indicatively and not critically between 150,000 and 250,000 points, is performed by a special transparency, diagrammed in Fig. 2, with which the card in question is customised.

The above mentioned device comprises a reader-codifier 20 for the card 22, a control unit 24 connected by means of line 26 to the bank information system and a scanner 28 designed for reading the fingerprint or fingerprints of the customer which are memorised after coding in the microprocessor integrated in the card 22.

The scanner 28 is provided with a seat appropriately formed and sized 28' on which the applicant places the finger or fingers for taking the fingerprint to be coded and memorised in the microprocessor. The latter contains also the key for transcodifying the code with points present in cryptographic form in field 16 of the strip 12 forming the paper support of the

paper support 10.

Said key or individual code consisting of an alphanumerical sequence univocally associated with each card holder is generated by the issuer information system, e.g. the bank, and send to the
5 device of customisation of the card 22, discussed below, through the line 26 of the device diagrammed in Fig. 2.

The card 22 containing the individual alphanumerical code and the mathematical expression associated with the fingerprint or fingerprints constitutes the basic document for arranging, by
10 the issuing organisation, the credit document on request of the customer by means of the device or equipment diagrammed in Fig. 3. Said equipment comprises a reader-codifier 30 for the card 22, a control unit 32 connected by means of line 36 with the issuer information system, e.g. the bank, to register the data
15 of the transaction (date, customer, agency, size of the credit document), a scanner 38 with window 40 for application of the finger or fingers of the customer and taking of the fingerprints, and commercial printer 42 having graphic modes and preferably external to the device and advantageously equipped
20 with an automatic feeder for supply of the strip 12 forming the paper support 10 to be customised.

The customisation of the credit document as mentioned above leads to a safety coding defined by a dot code applied in the fields 14, 16 of the paper support 12.

25 The coding is subject to validation of the fingerprint or fingerprints of the applicant who places his finger or fingers opposite the window 40 of the scanner 38.

Only after verification of the agreement between the mathematical parameters of the fingerprint memorised and those
30 of the finger placed in the window 40 is read the identification

- code of the customer, used as a cryptographic key for the univocal generation of the safety code to be placed in the fields 14, 16 of the document requested by the customer in accordance with the above described procedures.
- 5 A device designed for validation of the credit document at the sales points is diagrammed in Fig. 4 and calls for in addition to the components defined above and prerogative of the issuing equipment the customised document, a verifier 48 for reading of the dot code or codes 14 and/or 16 of the paper support 12, a
- 10 micrometric sensor 44 designed for measurement of the print relief achieved along prearranged points of the support and a perforation head 46 which performs cancellation of the credit document.
- 15 Creation of the latter in different sizes, subject to the provision of the card incorporating the identification codes of the customer and that of the fingerprint is performed by the following procedure by means of the corresponding equipment or devices. The customer who requests of the bank or analogous
- 20 institute issuance of the credit document which is the object of the present invention first applies his finger, or optionally several fingers in sequence, in the seat created on the device for issuance of the card, diagrammed in Fig. 2. The fingerprint or fingerprints are taken and memorised in algorithm form in the microchip of the card 22 without creation of archives of the
- 25 configuration of the fingerprint. Through the communication line 26 the bank system records the operation which gives rise to the issuance of the card and supplies the individual identification code consisting of the alphanumerical sequence, also memorised in said support. The next step concerns issuance of the
- 30 customised document or documents, performed by the device of

Fig. 3 which, after insertion of the card 22 and application of the finger in the window 40 of the scanner 38, takes and compares the fingerprint and prints, preferably with indelible ink, the dotted safety coding.

5 After said operations the customer has available the univocally customised card and the requested credit documents, spendable in the various approved sales points. Upon using said documents the customer, to give suitable guarantees, places his finger or fingers in the window 40' of the scanner
10 38', with which is equipped the device for validation shown in fig. 4, installed at the sales points. Comparison is performed between the picture taken by the scanner 38' and the alternatives memorised in the microchip of the card 22 inserted in the reader 30' of the above device. In case of positive
15 matching there is read the identification code of the customer with the intervention of the linear sensors 42 and micrometric sensor 44.

The sensor 42 reads the dotted code of the credit document, verifying the correctness of the data and ascertaining
20 consequently the univocal matching of the credit document with the card of the bearer. The micrometric sensor 44 measures the relief of the with copper-plate engraving print in some points of the credit document to ascertain the validity of the support. After performing these checks, the perforation head 46 cancels
25 the credit document per by means of perforation which defines the current account number of the subject who receives the credit document.

The flow of the payment system performable by the credit document which is the object of the present invention is
30 diagrammed in Fig. 5 in which are shown the various phases. The

issuing organisation A provides in the first place, with a device A1, for issuance of the personal card. Said organisation, with the device A2, then issues the credit documents requested by the customer. At the payment point, indicated by 8, the device or equipment B1 validates to credit document. The letter then returns to the issuing organisation A for actual collection C which completes the cycle.

In the hypothesis relating to the traditional credit card, the microchip which is provided the card allows performing memorisation of one or more fingerprints of the owner. Equipment basically identical with that for the card 22, connected to the paper support 10, permits provision of said memorisation and subsequent reading or taking of the fingerprint or prints for validation of the credit card. The customisation of the latter can involve or not also the memorisation of the microchip of an individual code of the type provided for the card 22.

The customisation credit card is preferably used independently to perform normal payments but can optionally replace the card 22 for the request and validation of the credit document 10. As may be seen from the foregoing the advantages of the present invention are clear.

The credit document which is the object of the present invention connected to the customisation card provides absolutely safe guarantees since it is unusable by any one different from the owner to whom it is issued. The receiver, in addition, has the certainty of the authenticity and goodness of the credit document which can be considered cash.

The equipment or device provided for issuance of the card or credit document as well as that of validation, allow performance of all the operations of forming and checking of the supports in

short times, excluding every risk of taking.

Particularly advantageously is the capability of taking several fingerprints of the customers finger and coding them in a mathematical expression. One of them can optionally be memorised
5 in the form of an alarm signal blocking the transaction, e.g. in the case where the customer is forced to use despite himself a credit document.

Another advantage is the capability of customising traditional credit cards by means of memorisation of one or more
10 fingerprints of the owner, transcodified in a microchip integrated in the card. The latter consequently cannot be used by a person different from the owner. At the sales points, the receiver can verify easily the agreement of the fingerprint of the customer with that or those memorised in the microchip of
15 the credit card shown.

The invention as described above and claimed below is proposed merely by way of example and it is understood that it can have numerous modifications and variations all falling within the inventive concept.

20 It is intended to be possible in particular optional alternative reversals of structure or displacements of component parts which as a whole form the equipment for formation and management of the credit documents which are the object of the present invention and alternative, formal or structural
25 configurations of the credit documents.

CLAIMS

1. Credit document (10) connected to a customised document or card (22) or independent customised credit card integrated on a microchip and comprising a watermarked paper support (12) with copper-plate engraving print characterised in that it exhibits
5 one or more safety codes referring to the transaction data and expressed in two fields (14) and (16) in linear dotted form and/or cryptographic form on the basis of a key consisting of an identification code, there being memorised in the microchip of the customised document or card (22) or the credit card said
10 identification code and at least one mathematical expression which transcodifies the parameters related to the fingerprint of one or more fingers of the applicant on the credit document (10):
2. Credit document in accordance with claim 1 characterised in
15 that said identification code memorised in the microchip of the customised document or card (22) is generated by the issuers information system and consists of an alphanumerical sequence.
3. Credit document in accordance with claim 1 characterised in that the safety code or codes are applied with indelible ink on
20 the watermarked paper support (12) further provided with one or more with copper-plate engraving print reliefs.
4. Equipment for issuance of the customised document or card (22) connected to the credit document (10) characterised in that it comprises a reader-codifier (20) for said card, a control
25 unit (24) connected by communication line (26) to the issuers information system from which it receives said key or identification code, and a scanner (28) with seat (28') for taking on one or more fingerprints memorisable after transcodification in the microchip integrated in said customised

document or card (22), taking of the fingerprint or fingerprints being performed along a number of dots between 150,000 and 250,000 units.

5 5. Equipment for issuance of the credit document (10) connected to the customised document or card (22) and characterised in that it comprises a reader-codifier (20) connected to the customised document or card (22) and characterised in that it comprises a reader-codifier (20) for said customised card, a control unit (32) connected by line (36) to the issuers
10 information system, a scanner (38) with window (40) for taking of the fingerprint or fingerprints of the applicant the credit document and a printer (42) having graphic modes in which are fed, manually or automatically, the watermarked paper supports (12) to be customised.

15 6. Equipment for validation of the credit document (10) connected to the customised document or card (22) or for validation of the credit card and characterised in that it comprises a reader-codifier (30'), a control unit (32'), a scanner (38') with window (40') for taking the fingerprint or
20 fingerprints of the owner of the credit document (10) or credit card, a verifier (48) with a linear optical sensor (42) for reading of the code or codes of the fields (14), (16) of the watermarked paper support (12) and micrometric sensor (44) for measurement of the with copper-plate engraving print reliefs
25 present on the support.

30 7. Equipment in accordance with one or more of the above claims because compatible and characterised in that it incorporates said component parts (30), (32), (38), (42) for issuance of the credit document (10) in combination with said verifier (48) and associated sensors (42), (44) for validation of the credit

document.

8. Credit card integrating a microchip in accordance with one or more of the above claims because compatible and characterised in that in said microchip is memorised at least one mathematical
5 expression which transcodifies the parameters related to the fingerprint of one or more fingers of the owner of the car.

9. Credit card in accordance with claim 8 characterised in that in said microchip is memorised an identification code in the form of alphanumerical sequence or equivalent generated by the
10 issuers information system.

10. Equipment for the issuance of the credit card independently customised in accordance with one or more of the above claims characterised in that it comprises a reader-codifier (20) for said credit card, a control unit (24) connected with
15 communication line (26) to the issuers information system and a scanner (28) with seat (28') for taking one or more fingerprints memorisable after transcodifying in the microchip integrated in the credit card.

11. Equipment in accordance with one or more of the above claims because compatible and characterised in that it incorporates
20 said means (20), (24), (26), (28), for customisation of the credit cards by means of memorisation in the microchip of one or more fingerprints transcodified, and/or means for taking and validating said fingerprints.

12. Credit document connected to a customised document and
25 related equipment for issuance and validation as described with particular concern for the reservations expressed in the last sentence of the descriptive part illustrated by way of example and for the specified purposes.

FIG. 1

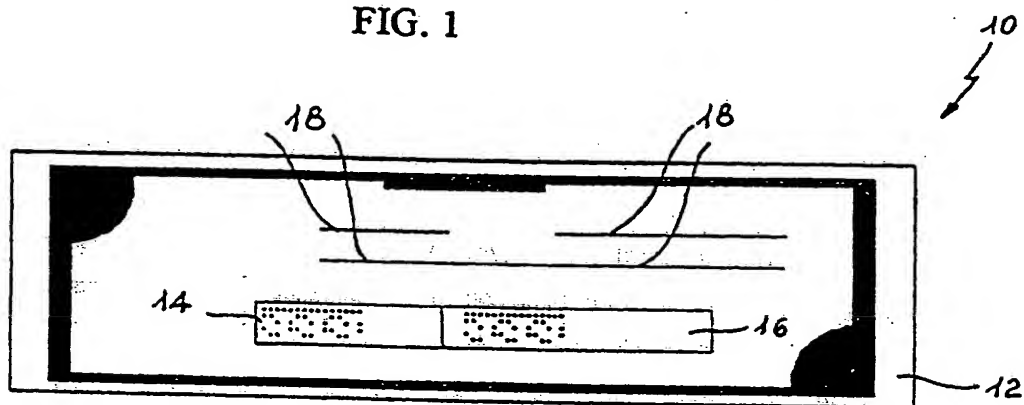


FIG. 2

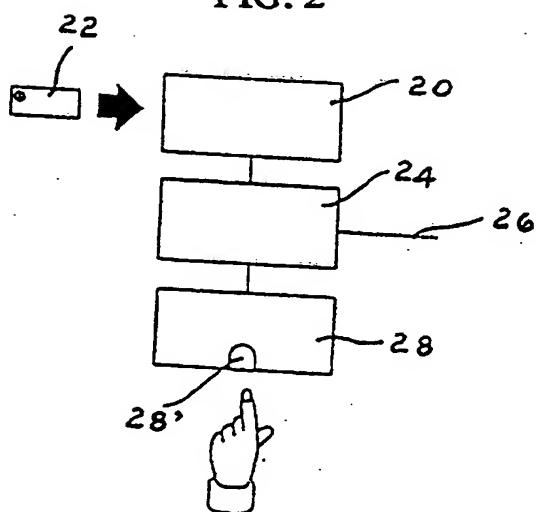


FIG. 3

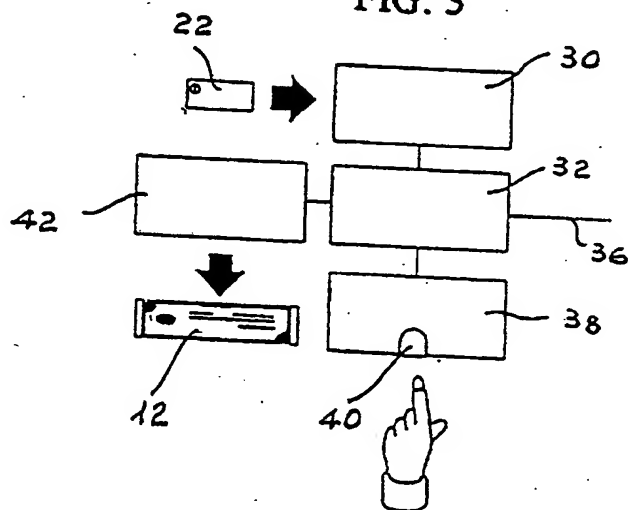


FIG. 4

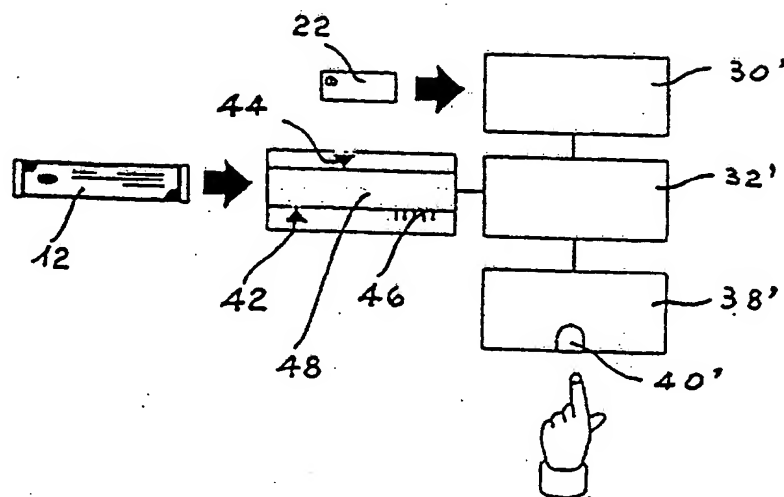
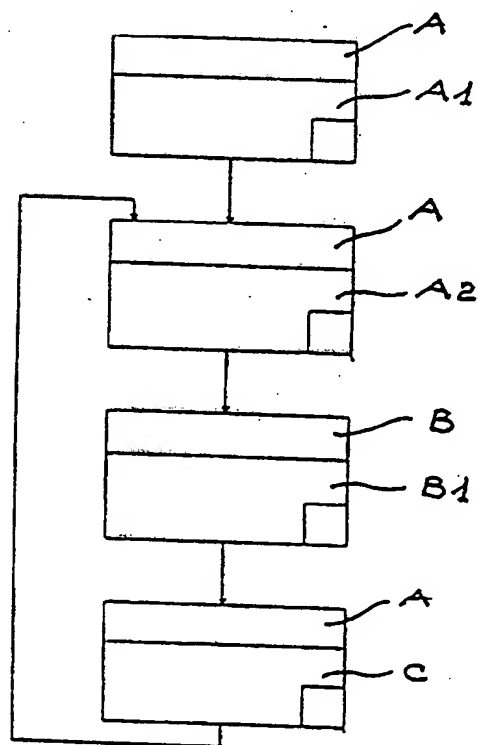


FIG. 5



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Inter. Application No
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A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 G07F7/10 G07F7/08 G07C9/00

According to International Patent Classification (IPC) or to both national classification and IPC

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Minimum documentation searched (classification system followed by classification symbols)

IPC 6 G07C G07F B42D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP,A,0 590 224 (RUSSI) 6 April 1994 see column 1, line 39 - column 6, line 7; claims; figures ---	1,4-6,12
A	FR,A,2 133 941 (OSTERTAG-WERKE) 1 December 1972 see page 8, line 1 - page 12, line 26; figures ---	1,4-6,12
A	WO,A,86 06527 (THE QUANTUM FUND) 6 November 1986 see page 12, line 26 - page 14, line 20; figures ---	1,4-6,12
A	EP,A,0 097 110 (BONNEVAL-LAMOTHE) 28 December 1983 see abstract; claims; figures ---	1,4-6,12
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INTERNATIONAL SEARCH REPORT

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C(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
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A	FR,A,2 441 222 (LABIN) 6 June 1980 see page 2, line 29 - page 3, line 3; claims ---	1,4-6,12
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A	GB,A,2 035 642 (BUNKER RAMO CORPORATION) 18 June 1980 see abstract; claims; figures see page 2, line 32 - line 89 ---	1,4-6,12
A	EP,A,0 504 616 (ASCOM AUTELCA) 23 September 1992 ---	
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INTERNATIONAL SEARCH REPORT

information on patent family members

International Application No

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